

Application Number 10/626,217
Amendment dated 28 September 2004
Reply to Office Action of 30 June 2004

Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

Claim 1 (currently amended): A method of forming a transistor gate stack, the method comprising:

forming a gate dielectric over a semiconductor substrate;
exposing the gate dielectric to a source of nitrogen excited species, wherein exposing incorporates less than about 10 atomic % nitrogen at a depth of greater than about 10 Å from an upper surface of the gate dielectric; and
depositing a silicon-containing gate electrode over the gate dielectric after exposing the gate dielectric to the source of nitrogen excited species, wherein the gate electrode contacts a portion of the gate dielectric exposed to the source of nitrogen excited species.

Claim 2 (original): The method of claim 1, wherein the gate dielectric comprises a material selected from the group consisting of aluminum oxide, zirconium oxide, hafnium oxide, tantalum oxide, barium strontium titanate and strontium bismuth tantalate.

Claim 3 (original): The method of claim 2, wherein the gate dielectric comprises zirconium oxide.

Claim 4 (original): The method of claim 1, further comprising exposing a surface of the semiconductor substrate to a source of nitrogen excited species prior to forming the gate dielectric.

Claim 5 (original): The method of claim 4, wherein exposing the surface of the semiconductor substrate forms less than about 10 Å of silicon oxynitride.

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Claim 6 (original): The method of claim 5, wherein forming the gate dielectric comprises an atomic layer deposition.

Claim 7 (original): The method of claim 1, wherein depositing the silicon-containing gate electrode comprises depositing a layer of silicon-germanium by chemical vapor deposition.

Claim 8 (original): The method of claim 7, further comprising flowing germane over the gate dielectric.

Claim 9 (currently amended): A method of forming a transistor gate stack, the method comprising:

forming an oxide layer over a semiconductor substrate;

exposing an upper surface of the oxide layer to products of a plasma, such that less than 10 atomic % of the products of the plasma are incorporated into the oxide layer at a depth of greater than about 10 Å from the upper surface; and

depositing a silicon-containing gate electrode over the upper surface after exposing the upper surface to the products of the plasma, such that the gate electrode contacts the upper surface of the oxide layer.

Claim 10 (original): The method of claim 9, wherein the oxide layer is a gate dielectric.

Claim 11 (original): The method of claim 9, wherein the oxide layer comprises zirconium oxide.

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Claim 12 (original): The method of claim 9, further comprising exposing a surface of the semiconductor substrate to a source of nitrogen excited species prior to forming the oxide layer.

Claim 13 (original): The method of claim 12, wherein exposing the surface of the semiconductor substrate forms less than about 10 Å of silicon oxynitride.

Claim 14 (original): The method of claim 9, wherein forming the oxide layer comprises an atomic layer deposition.

Claim 15 (original): The method of claim 9, wherein the products of the plasma comprise nitrogen excited species.

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